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Used nuclear fuel is coming down the roads and rails. Will local officials know how to respond?

It's All in the Preparation



The Yankee reactor vessel, on its way from Massachusetts to South Carolina.

It's late April in central Massachusetts, and bed sheets hanging by the railroad tracks carry messages of doom. An anti-nuclear vigil awaits a shipment with the reactor vessel from the closed Yankee nuclear power plant. The protesters ask the forgiveness of Barnwell, S.C.—soon to become the final resting place for the low-level radioactive waste.

On May 7, the reactor vessel arrives at the Barnwell disposal facility.

Safely, like the millions of packages of radioactive materials shipped throughout the United States.

"Radioactive materials are routinely shipped on the railways and the roadways in the United States," says Kelley Smith, spokeswoman for the plant's owner, Yankee Atomic Electric Co. "And it has a tremendous safety record."

During the past 40 years, more than 20,000 shipments of used nuclear fuel have traveled throughout the world—including 2,500 commercial shipments in the United States—with no radiation-related injuries or death.

Mile for mile, vehicle for vehicle, that might be the winner in national transportation safety. A key reason behind the safety record: training and preparation.

Accidents, of course, happen on all of America's transportation routes. But in 40 years, only seven accidents in the United States have involved used nuclear fuel containers. In three of the accidents, the containers were empty. The worst of the seven occurred in 1971 in Tennessee. A tractor-trailer carrying a 25-ton

Accidents can happen. But with proper preparation, they don't have to endanger the public. That's why no Boy Scout comes better prepared than the people who package, ship and monitor the transportation of used fuel from nuclear power plants.

BY ALAN CHAPPLE

shipping container filled with used nuclear fuel swerved to avoid a head-on collision. As the truck overturned, the trailer—with the fuel container still attached—skidded into a rain-filled ditch. The container suffered minor damage but released no radioactive material.

Even if radiation had been released, the local emergency responders at the scene minutes after the wreck would have cordoned off the shipping container and kept bystanders at a safe distance. Then, a state or federal hazardous materials team would have cleaned up the accident.

They would have followed proper response and cleanup procedures, thanks to advance training and preparation—one part of a web of federal, state and local efforts that provide unparalleled public safety.

Strict federal regulations govern the training of transportation personnel. And in many states, emergency responders augment their hazardous materials training with specific instruction on responding to an event involving radioactive materials. Proposed legislation to develop an integrated nuclear fuel management program includes provisions for resources to conduct more training in road and rail transportation of used fuel to storage and disposal facilities in Nevada.

For instance, legislation approved by the U.S. Senate in April (S. 104) requires:

- a radioactive waste training program for emergency responders as well as for radiological protection and emergency medical

personnel along primary and alternate shipping routes.

- police instruction in command and control procedures for responding to an accident.
- grants of at least \$150,000 to states and Indian tribes to develop plans and prepare for used fuel shipments.

The bill also includes a “no shipments if no training” provision.

Those assurances helped earn the transportation plan outlined in S. 104 an endorsement from the International Association of Fire Chiefs.

As long as emergency responders receive proper training, “we at the Fire Chiefs have taken the position that, yes, you can safely move [used fuel],” says John Eversole, chairman of the association’s hazardous materials committee. “It’s like anything else: You have to be properly prepared. That’s why [firefighters] go to school to learn how to deliver babies.

“But we are very insistent that the emergency responders along these routes have some basic knowledge,” adds Eversole, who also is chief of the Chicago Fire Department and its coordinator of hazardous materials. “We don’t need to make them physicists or radiological experts. But emergency responders need to understand what is being shipped, how it acts or reacts, what to do if there is an emergency, how to use any special equipment [like radiation-monitoring devices], and they need to understand consequence management. If you have that pre-planned, then it’s not a big deal.”

Other emergency responders feel similarly. More than 80 percent of emergency response professionals surveyed in April 1996 by Meridian Research said they believe adequate training—more than anything else—is needed “to ensure that your jurisdiction is prepared technically to protect public health and the environment” during a major used fuel shipping campaign. Most of the responders also singled out DOE as the best suited to oversee training, and 58 percent said that training should be carried out within two years of the start of shipments.

The merits of federal emergency response training were proven in the wee hours of a snowy, fog-bound April morning in 1995. At 3 a.m., a late-model Chevy pickup skidded off the interstate and overturned in Sweetwater County, Wyoming.

The driver and his two children scrambled to safety. But something else escaped from the truck: a small container of iridium—a radioactive tracer used by oil-well drillers.



The [International Association of] Fire Chiefs have taken the position that, yes, you can safely move [used fuel]. ...In looking at the modes of transportation and the protective measures that have been taken, it seems to us that a superior job has been done in preparing to move this product.”

***—John Eversole,
Chief of the Chicago Fire
Department***

If properly packaged in a lead container, the iridium would have stayed safely sealed—even in a rollover. But the driver had left it in a plastic pipe inside a metal box. When the truck flipped over, the box snapped open. Sixteen ounces of gelled iridium beads spilled onto the ground.

Soon, with the help of highway patrolmen, firefighters, and the Wyoming Emergency Management Office in Cheyenne, the area was cordoned off. While responders cleaned up the spilled iridium, removing about 500 feet of dirt in the process, officials kept tabs on radioactivity levels. Nine hours later, the site was pronounced clean.

“One of the big things that helped was that we’d had a [Department of Energy] field exercise some months earlier,” says local fire chief, Brad Sarff. “That gave us the opportunity to test our concepts and actually work our system. When we had this incident, it didn’t seem like anything real unusual.”

Move that accident to another state, and the emergency response would have been just as effective, thanks to federal training programs sponsored by DOE and the Federal Emergency Management Agency (FEMA).

One training program—FEMA’s Radiological Emergency Response Operations course—teaches responders “what they really need to know,” says trainer Anthony Gaglierd, chief radiological officer in Allegheny County, Pa.

The program curriculum includes the basics of radiation, and students are told it’s easy to protect themselves from radiation at an accident site. “The simplest thing is just to walk away from it,” Gaglierd says.

For many emergency responders, nuclear fuel management merely supplements the hazardous materials instruction they’ve received as firefighters and police officers. That foundation of knowledge counters claims that accident training for nuclear fuel shipments will take years to complete, says Chicago Fire Chief Eversole.

“Come on,” he says. “We deal with consequence management every day in the fire service. Every day we’re going to emergencies and we’re trying to minimize the damage, minimize the injuries to people. ...This is just one more thing.”

To further bolster the safety of used nuclear fuel shipments, states are working with DOE to ensure they have input in transportation routing decisions.

Ohio, for instance, is developing a statewide routing plan, which will become part of a larger scheme being assembled by the 12-state Midwestern High-Level Radioactive Waste Committee.

Even though highway shipments will largely be confined to the nation's interstates, states like Ohio still want a say in determining the actual routes. "The states, as well as locals in cooperation with the state, should have input to DOE on what the routes should be," says Robert Owen, manager of technical services for the Ohio Bureau of Radiation Protection and gubernatorial appointee to the 12-state committee.

"We feel that alternate routes should be designated for bad weather, construction, population densities, and the propensity for an accident along a particular route during a particular season," Owen says. "There may be local problems that cause you to say, 'Not on this road. Not today.' Ohio needs to decide for Ohio where this stuff is going to go."

But what if a used fuel shipment were involved in a wreck?

Opponents of used fuel transportation paint ghastly images of the consequences of such an accident. Using their weapon of choice—fear—groups like Greenpeace and the Nuclear Information and Resource Service have dubbed used nuclear fuel shipments "mobile Chernobyls," despite an impeccable safety record.

Even Nevada Sen. Harry Reid (D), attempting to keep federal facilities for used fuel storage and disposal out of his state, claimed last summer on the Senate floor that each container being transported "would contain a radiological equivalent of 200 Hiroshima bombs. All together, the nuclear tonnage would be enough to kill everybody on Earth."

Despite this steady volley of rhetoric, experts agree there would be almost no radiation-related consequences—even in the event that a shipment of used fuel were in an accident. That's largely because of the solid, non-explosive nature of the fuel and the robust design of the shipping containers, which must be approved by the Nuclear Regulatory Commission.

"When you put it in the context of all the other hazardous materials that are in transport on any given day or week, the risk from spent fuel is pretty minimal," says Gordon Appel, deputy director of the Illinois Department of



I'd rather have a shipment of spent nuclear fuel coming through my town than a truck load of gasoline, because gasoline can do a lot more damage to a lot more people than a shipment of spent fuel.

***—Gordon Veerman,
Fire Chief at Argonne
National Laboratory***

Nuclear Safety. The greatest potential hazard would be "that one of the casks somehow falls off the truck and whatever it rolls on is crushed," he says.

"There are a lot worse things out there," agrees Oklahoman Gene Carlson, who has spent more than 20 years teaching and writing about hazardous materials. "You've got 10,000 gallons of gasoline routinely being shipped in a piece of aluminum that's an eighth of an inch thick. And nobody thinks anything of that."

Gordon Veerman, fire chief at Argonne National Laboratory in Illinois, says he finds comfort in the fact that used fuel shipments can be quickly and easily monitored for leaks of radiation. "If you have a chemical spill, it may take you weeks to find out what the chemical is. You may never know the extent of damage to people who have inhaled a chemical—there's no measurable way to know," he says.

While transportation emergency responders are comfortable with the knowledge that shipments of used nuclear fuel will increase once a federal storage facility opens, the public appears apprehensive.

Improving public acceptance of used nuclear fuel shipment requires public education, says Dale Klein, associate vice president of special engineering programs in the University of Texas system.

Klein believes fear and apprehension would dissipate if the public "knew about the training, the robustness of the designs [of the shipping canisters], the amount of study and rigorous testing of the casks and the fact that shipments will be monitored by satellite. There is a lot of in-depth safety analysis that has been done.

"This is not something that the industry and government have taken lightly," he says. ■

Need more information about the safe transportation of used nuclear fuel? The Nuclear Energy Institute offers a variety of resources, such as access to experts and speakers, as well as "Safety Every Step of the Way"—an information kit that includes a transportation video and a number of fact sheets. Contact Julie Jordan at 202.739.8118.



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